Assignment 3

Common Fractions; Decimals

Textbook Assignment: Chapters 4 (29-44), 5 (45-51)

3-1. Assume that a man measures a $\frac{3}{4}$ -inch block four times. Each time he uses different graduations on his ruler. Which of his measurements is incorrect?

    1. $\frac{6}{8}$ in.   3. $\frac{25}{32}$ in.

    2. $\frac{12}{16}$ in.   4. $\frac{48}{64}$ in.

3-2. Which of the following fractions is not equivalent to $\frac{1}{2}$?

    1. $\frac{0.5}{1}$ 3. $\frac{327}{652}$

    2. $\frac{125}{250}$ 4. $\frac{1\frac{1}{4}}{2\frac{1}{2}}$

3-3. The fundamental rule of fractions states that adding the same number to both terms of a fraction does not change the value of the fraction.

3-4. How may the fraction $\frac{3}{8}$ be changed to twenty-fourths?
    1. Multiply the numerator by 3
    2. Multiply the denominator by 3
    3. Multiply both terms of the fraction by 3
    4. Multiply both terms of the fraction by 24

3-5. What fraction with a numerator of 8 is equivalent to the fraction $\frac{2}{6}$?

    1. $\frac{3}{8}$ 3. $\frac{8}{24}$

    2. $\frac{8}{3}$ 4. $\frac{8}{48}$

3-6. Which of the following fractions cannot be reduced to lower terms?

    1. $\frac{39}{52}$ 3. $\frac{89}{121}$

    2. $\frac{48}{72}$ 4. $\frac{144}{256}$

3-7. The fraction $\frac{78}{234}$, when reduced to lowest terms, becomes

    1. $\frac{1}{3}$ 3. $\frac{39}{117}$

    2. $\frac{13}{39}$ 4. $\frac{78}{234}$

3-8. It is incorrect mathematically to compute with improper fractions.

3-9. The improper fraction $\frac{22}{8}$ when changed to a mixed number and reduced to lowest terms becomes

    1. $\frac{11}{4}$ 3. $2\frac{5}{8}$

    2. $2\frac{3}{4}$ 4. $2\frac{6}{8}$

3-10. The mixed number $3\frac{7}{9}$ is equivalent to the improper fraction

    1. $\frac{11}{3}$ 3. $\frac{30}{9}$

    2. $\frac{16}{9}$ 4. $\frac{34}{9}$

3-11. Multiplying each term of a fraction by −1 has the same effect as
1. multiplying the fraction by 1
2. multiplying the fraction by −1
3. changing the sign of the numerator only
4. changing the sign in front of the fraction

3-12. Which one of the following four fractions differs in value from the other three?
1. $\frac{-3}{4}$
2. $-\frac{3}{4}$
3. $\frac{3}{-4}$
4. $\frac{-3}{-4}$

3-13. Fractions must always be changed into like fractions before they can be added.

3-14. The person who states that
$$\frac{9}{24} + \frac{1}{2} + \frac{5}{24} = \frac{15}{24}$$
has failed to observe that
1. to find the sum of two or more fractions, the numerators should be added to obtain the numerator and the denominators should be added to obtain the denominator
2. fractions must be reduced to lowest terms before they are added
3. fractions cannot be added without raising them to higher terms
4. quantities to be added must be expressed in common denominators

3-15. The fractions $\frac{4}{7}$ and $\frac{4}{9}$ are unlike fractions.

3-16. The least common multiple (LCM) of 60, 36, and 18 is
1. 180
2. 540
3. 1080
4. 2160

3-17. Which of the following groups of fractions has the smallest least common denominator?
1. $\frac{2}{3}, \frac{5}{9}, \frac{7}{18}$
2. $\frac{3}{8}, \frac{5}{16}, \frac{3}{4}$
3. $\frac{5}{6}, \frac{4}{12}, \frac{2}{3}$
4. $\frac{20}{25}, \frac{13}{15}, \frac{9}{10}$

3-18. What method do you use in finding a common denominator for a series of fractions?
1. Add all the denominators.
2. Cancel the common factors in numerators and denominators.
3. Find the smallest number that all of the numerators will go into.
4. Find the smallest number that is divisible by all the denominators.

3-19. Find the LCM of the following numbers:
$180 = 5 \cdot 2^2 \cdot 3^2$; $210 = 5 \cdot 2 \cdot 3 \cdot 7$; $225 = 5^2 \cdot 3^2$
[Note: 2^3 means 2 is taken as a factor three times]
1. $5^2 \cdot 2 \cdot 3 \cdot 7$
2. $5^2 \cdot 2^2 \cdot 3^2 \cdot 7$
3. $5^4 \cdot 2^3 \cdot 3^5 \cdot 7$
4. $180 \cdot 210 \cdot 225$

3-20. Find the greatest common divisor (GCD) of 6, 15, and 21.
1. 3
2. 6
3. 210
4. $3^3 \cdot 2 \cdot 5 \cdot 7$

3-21. Find the GCD of the numbers
$120 = 2^3 \cdot 3 \cdot 5$; $140 = 2^2 \cdot 7 \cdot 5$; $42 = 2 \cdot 3 \cdot 7$
1. 2
2. 6
3. $2^3 \cdot 3 \cdot 5 \cdot 7$
4. $120 \cdot 140 \cdot 42$

3-22. What lowest common denominator (LCD) would be used to add $\frac{1}{9}, \frac{4}{7}, \frac{3}{35},$ and $\frac{3}{25}$?
1. 1575
2. 2205
3. $3^2 \cdot 7 \cdot 9 \cdot 5$
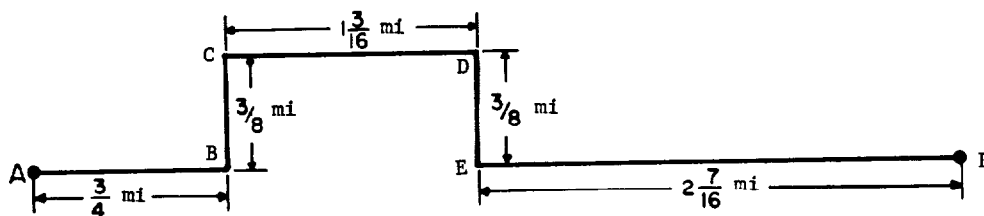4. $9 \cdot 7 \cdot 35 \cdot 25$

Figure 3A.--Illustration for addition of fractions.

3-23. What is the sum of $2\frac{3}{4}$ and $1\frac{5}{6}$?

1. $4\frac{1}{9}$ 3. $4\frac{1}{12}$

2. $4\frac{3}{8}$ 4. $4\frac{7}{12}$

3-24. In figure 3A, find the distance along the fence ABCDEF.

1. $4\frac{1}{16}$ mi   3. $5\frac{1}{8}$ mi

2. $4\frac{3}{4}$ mi   4. $5\frac{3}{4}$ mi

3-25. How much is $\frac{3}{12}$ subtracted from $1\frac{5}{8}$?

1. $1\frac{3}{8}$ 3. $1\frac{7}{24}$

2. $1\frac{7}{8}$ 4. $\frac{3}{8}$

3-26. In figure 3B, what is the length of the dimension marked Y on the sketch of the machine bolt?·

1. $1\frac{62}{64}$ in.   3. $2\frac{11}{64}$ in.

2. $2\frac{5}{64}$ in.   4. $2\frac{7}{64}$ in.

3-27. How much is $\frac{1}{24}$ of 6?

1. 4   3. $\frac{1}{3}$

2. $\frac{1}{4}$ 4. $\frac{1}{144}$

3-28. What is the product of $3\frac{1}{2} \times \frac{5}{12}$?

1. $1\frac{11}{24}$ 3. $2\frac{7}{9}$

2. $1\frac{1}{4}$ 4. $8\frac{1}{3}$

3-29. The answer to the problem

$$\frac{\cancel{3}}{\cancel{5}} \times \frac{\cancel{5}}{\cancel{9}} \times \frac{\cancel{2}}{\cancel{4}} \times \frac{\cancel{7}}{\cancel{3}} = 6$$

is wrong because
1. the sum of 3 and 2 is 5
2. a mistake was made in division
3. the wrong numbers were divided out
4. the numerator was omitted in the answer

3-30. What is the answer to the problem

$$\frac{5}{2} \times \frac{1}{4} \times \frac{2}{3}$$

when reduced to lowest terms?

1. $\frac{5}{8}$ 3. $\frac{10}{24}$

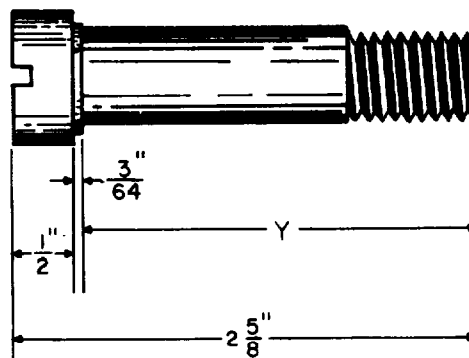2. $\frac{5}{12}$ 4. $\frac{15}{36}$

Figure 3B.--Sketch of a machine bolt.

3-31. Use canceling to determine the product of $\frac{96}{144} \times 38$.

1. 23
2. $25\frac{1}{3}$
3. $27\frac{2}{3}$
4. $37\frac{1}{3}$

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3-32. The common denominator method of dividing fractions is illustrated by the example

1. $\frac{4}{3} \div \frac{1}{2} = \frac{4 + 4}{3} = \frac{8}{3}$

2. $\frac{4}{3} \div \frac{1}{2} = \frac{4}{3} \times 2 = \frac{8}{3}$

3. $\frac{4}{3} \div \frac{1}{2} = \frac{4}{3} \times \frac{2}{1} = \frac{8}{3}$

4. $\frac{4}{3} \div \frac{1}{2} = \frac{8}{6} \div \frac{3}{6} = 8 \div 3 = \frac{8}{3}$

3-33. What is the simplest way to find the reciprocal of a fraction?
1. Divide the fraction by 1.
2. Subtract the fraction from 1.
3. Divide the numerator by the denominator.
4. Interchange the numerator and denominator.

3-34. The reciprocal of $3\frac{1}{7}$ is

1. $\frac{22}{7}$ 3. $1\frac{3}{7}$

2. $\frac{7}{22}$ 4. $7\frac{1}{3}$

3-35. The reciprocal of 50 is greater than the reciprocal of 25.

3-36. The reciprocal method of dividing fractions is illustrated by the example

1. $\frac{3}{8} \div \frac{1}{3} = \frac{1}{8} \times \frac{1}{1} = \frac{1}{8}$

2. $\frac{3}{8} \div \frac{1}{3} = \frac{3}{8} \times \frac{3}{1} = \frac{9}{8}$

3. $\frac{3}{8} \div \frac{1}{3} = \frac{9}{24} \div \frac{8}{24} = 9 \div 8 = \frac{9}{8}$

4. $\frac{3}{8} \div \frac{1}{3} = \frac{1}{8} \times \frac{1}{3} \times \frac{3}{1} \times \frac{8}{1} = 1$

3-37. How much is 4 divided by $1\frac{1}{8}$?

1. $3\frac{1}{3}$ 3. $3\frac{5}{9}$

2. $3\frac{4}{9}$ 4. $4\frac{1}{2}$

3-38. How much is $6\frac{2}{3}$ divided by $4\frac{2}{3}$?

1. $1\frac{3}{7}$ 3. $1\frac{1}{2}$

2. $1\frac{6}{7}$ 4. $3\frac{1}{9}$

3-39. How much is $8\frac{1}{5}$ divided by 6?

1. $1\frac{11}{30}$ 3. $2\frac{7}{10}$

2. $1\frac{5}{12}$ 4. $49\frac{1}{5}$

3-40. Using the formula $R_t = \dfrac{1}{\dfrac{1}{R_1} + \dfrac{1}{R_2}}$, find R_t when $R_1 = 6$ and $R_2 = 3$.

1. $\frac{1}{9}$ 3. 2

2. $\frac{1}{2}$ 4. 9

3-41. The fraction $\frac{3}{4}$ is in the form of a decimal fraction.

3-42. Decimal fractions are expressed in terms of
1. twentieths and powers of one-twentieth
2. twelfths and multiples of twelfths
3. tenths and powers of one-tenth
4. fifths and multiples of fifths

3-43. In the number 89,654 the nine is in which place?
1. Ten thousands
2. Thousands
3. Hundreds
4. Tens

3-44. In the decimal fraction 0.03672 the seven is in which place?
1. Tenths
2. Hundredths
3. Thousandths
4. Ten-thousandths

3-45. Which of the following measurements made in a machine shop is the largest?
1. 3.0070
2. 3.1540
3. 3.0988
4. 3.2100

3-46. Which of the following groups of mixed decimals is arranged correctly in order of decreasing size?
1. 0.941, 0.0442, 0.881, 0.0005
2. 1.055, 10.55, 0.1055, 105.5
3. 112.1, 9.856, 1.002, 0.0776
4. 1562.81644, 1791.816, 1338.22, 745.14

3-47. The fraction $\frac{86}{100000}$ is written in the shortened form as
1. 0.86
2. 0.086
3. 0.0086
4. 0.00086

3-48. In the expression $\frac{1}{2} \div 0.1432$ the zero is used for clarity.

3-49. The number $\frac{28}{10000}$ written as a decimal fraction is
1. 0.2800
2. 0.0280
3. 0.0208
4. 0.0028

3-50. The number $\frac{304}{100000}$ written as a decimal fraction is
1. 0.0000304
2. 0.000304
3. 0.00304
4. 0.0304

3-51. In common usage the word decimal often refers to a decimal fraction.

3-52. An example of a mixed decimal is
1. 0.127
2. 862.0
3. 137.84
4. $0.033\frac{1}{3}$

3-53. Seven and twelve-thousandths is the correct way to read the number
1. 7.012
2. 7.0012
3. 7.1200
4. 712,000

3-54. An example of a complex decimal is
1. $(4.1367)^2$
2. 345.678
3. $0.012\frac{1}{7}$
4. 0.00000001

3-55. In actual practice the decimal fraction 4.016 is read
1. four point sixteen thousandths
2. four and sixteen hundredths
3. four point zero one six
4. four and zero one six

3-56. Changing 0.49 to the equivalent form 0.4900 has the same effect as multiplying the common fraction form $\frac{49}{100}$ by
1. 10
2. 100
3. $\frac{1}{10}$
4. $\frac{100}{100}$

3-57. Which statement indicates the correct method for rounding off $\frac{349}{1000}$ to the nearest hundredth?
1. $\frac{349}{1000}$ is closer to $\frac{30}{100}$ than to $\frac{40}{100}$ so it is rounded to $\frac{30}{100}$.
2. $\frac{349}{1000}$ is written 0.0349 and rounded to 0.035.
3. $\frac{349}{1000}$ is closer to $\frac{35}{100}$ than to $\frac{34}{100}$ so it is rounded to $\frac{35}{100}$.
4. $\frac{349}{1000}$ is written 0.349 and rounded to 0.35 and then to 0.40.

3-58. The number 38.56935 rounded off to two decimal places is
1. 38.56
2. 38.57
3. 38.59
4. 38.60

3-59. The number 17.86 rounded off to the nearest tenth is
1. 17.0
2. 17.8
3. 17.9
4. 18.0

3-60. The decimal fraction 0.180 written as a common fraction in lowest terms is
1. $\frac{3}{17}$
2. $\frac{9}{50}$
3. $\frac{18}{100}$
4. $\frac{36}{200}$

3-61. Changing the decimal 0.75 to twelfths results in

1. $\dfrac{108}{144}$

2. 9.00

3. $\dfrac{9}{12}$

4. $\dfrac{8}{12}$

3-62. What condition must exist in order for a decimal fraction to be reducible when changed to a common fraction?
1. The denominator must be divisible by 2^2.
2. The numerator must be divisible by 5 and 2.
3. The numerator must be divisible by either 5 or 2.
4. The numerator must not be divisible by both 2 and 5.

3-63. The complex decimal $0.06\dfrac{1}{5}$ may be written in an equivalent form as

1. 0.065

2. $\dfrac{6}{100}$

3. $\dfrac{31}{500}$

4. $\dfrac{65}{1000}$

3-64. A common fraction can be converted to an exact decimal when the denominator of the common fraction is
1. $2 \cdot 3$
2. $2^2 \cdot 5^2$
3. $2 \cdot 5 \cdot 7$
4. $3 \cdot 5 \cdot 7$

3-65. The procedure for converting $27\dfrac{3}{8}$ to a decimal is to
1. multiply both the 3 and the 8 by 100 and add the result to 27
2. divide 8 by 3 and add the resulting decimal fraction to 27
3. divide 3 by 8 and add this result to 27
4. multiply 27 by 8 and add 3

3-66. What is the mixed number $7\dfrac{3}{5}$ expressed as a decimal?
1. 0.131
2. 4.20
3. 7.16
4. 7.60

3-67. The common fraction $\dfrac{5}{12}$ is closest to the decimal fraction
1. 0.333
2. 0.4133
3. 0.4167
4. 0.4168

3-68. The fraction $\dfrac{7}{16}$ expressed as a decimal and rounded off to the nearest hundredth is
1. 4.37
2. 0.40
3. 0.43
4. 0.44

3-69. How can you change the fraction $\dfrac{7}{12}$ to a decimal?
1. Multiply 12 by 7
2. Divide 12 by 7
3. Divide 7 by 12
4. Divide 7 by 10

3-70. In adding decimals, it is recommended that the digits be alined from the right and that the decimal be located by estimation.

3-71. A feeler gage has blades 0.025, 0.005, 0.004, 0.003, 0.0025, 0.002, and 0.0015 inch thick. The blades that should be used to make a setting of 295 ten-thousandths are the blades with thicknesses of
1. 0.025, 0.004, and 0.0015 in.
2. 0.025, 0.003, and 0.0025 in.
3. 0.025, 0.0025, and 0.002 in.
4. 0.005, 0.003, 0.0025, and 0.0015 in.
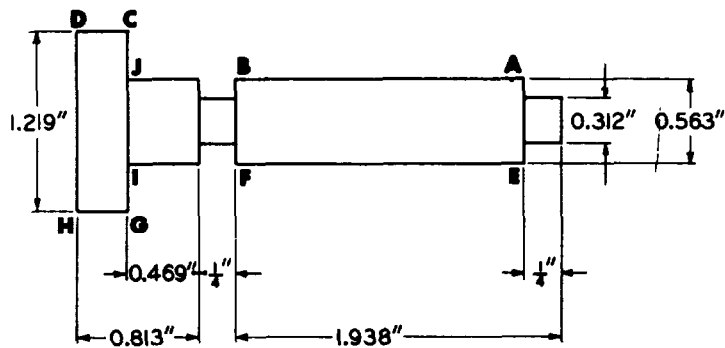
3C.--Dimensions of machine part.

● In answering items 3-72 through 3-75 refer to figure 3C.

3-72. What is the total length of the machine part?
1. 2.012 in.
2. 2.759 in.
3. 2.771 in.
4. 3.001 in.

3-73. What is the distance from point B to point J?
1. 0.212 in.
2. 0.492 in.
3. 0.719 in.
4. 1.019 in.

3-74. What is the length of the shaft from point A to point B?
1. 1.485 in.
2. 1.688 in.
3. 1.713 in.
4. 1.918 in.

3-75. What is the thickness of the shoulder from point C to point D?
1. 0.344 in.
2. 0.351 in.
3. 0.435 in.
4. 0.454 in.